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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MCCAIG, BRIAN A

ART UNIT

PAPER NUMBER

1797

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DELIVERY MODE

03/31/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/537,974	Applicant(s) MOUREAUX ET AL.	
	Examiner BRIAN MCCAIG	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 18 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 3 and 8-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7 and 12-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Summary

1. This Office action is in response to the 10/537974 application filed June 9, 2005 and amended December 18, 2008.
2. Amendment to claims 1, 4-5, 12-15 and cancellation of claims 3 and 8-11 are noted.
3. New grounds of rejection based on applicant's amendment follow.

Response to Amendment

4. The reply filed on December 18, 2008, is not fully responsive to the prior Office Action because of the following omission(s) or matter(s): objection to the specification. See 37 CFR 1.111. Since the above-mentioned reply appears to be *bona fide*, applicant is given **ONE (1) MONTH or THIRTY (30) DAYS** from the mailing date of this notice, whichever is longer, within which to supply the omission or correction in order to avoid abandonment. EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136(a).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over BAKER, Jr. ET AL (US 5951848) in view of TOBA ET AL in *Journals of Materials Chemistry* (1994, vol 4, no 7, pgs 1131-1135) and CHEN ET AL (US 6723297 B2), hereafter referred to as BAKER, TOBA, and CHEN, respectively.**

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7. With respect to claim 1, BAKER discloses a process to prepare a base oil having a viscosity index between within the range required in the instant application [Table 2] starting with a feedstock having at least 200 ppm sulfur [feeds K & L in Table 2] that is a distillate [column 4, lines 21-23] comprising:

a. contacting the feedstock with hydrogen on a sulfided [column 7, lines 27-39] hydrodesulfurization catalyst having Group VI and Group VIII metals of which tungsten and nickel, respectively, are obvious variants [as evidenced by Table 1, column 6] in the required concentrations [column 6, lines 7-13] with a total pore volume above 0.4 ml/g and the required pore volume having a diameter greater than 350 angstroms [column 6, lines 32-42], and

b. performing a pour-point reducing step on the effluent of step (a) [column 3, lines 34-50].

8. BAKER does not appear to explicitly disclose that the alumina is present in the amount recited in the instant application.

9. However, the properties of amorphous alumina/silica supports depend on their preparation procedures as evidenced by TOBA [paragraph 1, page 1131 & Tables 1 and 2, page 1133]. For example, the surface area of the catalyst is dependent on both the preparation method (e.g., sol-gel, co-precipitation, or hydrogel kneading) as well as the ratio of alumina to silica. For example, for alumina concentrations ranging from 0 to 50%, which overlaps the range of the instant application, the surface area of silica/alumina support prepared by the sol-gel method has a minimum surface area of 573 m²/g [Table 2]. In most cases, surface area increases with decreasing alumina content regardless of the preparation method [see Table 2]. Therefore, it is obvious that in order for the catalyst of BAKER to have the surface area disclosed (e.g., 170 m²/g in Table 1), the alumina concentration is likely between 0 and 50% as evidenced by TOBA, which overlaps the range in the instant application.

10. BAKER also does not appear to explicitly disclose required surface area or that the hydrodesulfurization catalyst comprises up to 8 wt % of a large pore molecular sieve.

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11. However, CHEN, which is concerned with the hydrodesulfurization catalysts for feedstocks similar to BAKER, discloses [see, e.g., column 7, lines 8-57 & column 8, lines 13-17] a molecular sieve (zeolite) ranging from 0 to 60 wt%, which subsumes the required range, as well as the required surface area [column 10, lines 19-23].

12. At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the process of BAKER with the amorphous Ni/W-Al₂O₃/SiO₂ catalyst of CHEN due to its simplicity, controllability, and energy efficiency as disclosed by CHEN [column 3, lines 44-46]. Furthermore, since CHEN discloses that the molecular sieve (zeolite or, alternatively, crystalline compound) promotes activity [column 3, lines 31-34 & 38-41] and BAKER discloses the possibility of using fluorine to also improve activity [column 6, lines 58-60], it would have been obvious to one of ordinary skill in the art to substitute the molecular sieve of CHEN for the fluorine of BAKER. Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

13. With respect to claim 2, the applicant is reminded that when the prior art composition such as the hydrocracking catalyst of BAKER is the same as a composition described in the specification for carrying out the claimed method, it can be assumed the composition will inherently perform the claimed process of yielding a certain weight percentage of C₄-hydrocarbon cracking products as required in claims 2 and 3 of the instant application under the conditions described therein. *In re King*, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986). For example, the amounts of metals present on the catalyst of BAKER range from 1 to 10 wt% Group VIII (e.g., nickel) and 10 to 30 wt% Group VI (e.g., tungsten) [column 6, lines 7-13] (compare to 2-10 wt% nickel and 5-30 wt% tungsten in the specification [page 3]); the catalysts are pre-sulfided [column 7, lines 28-39]; the surface areas [Table 2] are all greater than 100 m²/g; the pore volumes range from 0.33 to 0.45 ml/g; and the pore diameters range from 50-400 angstroms. Therefore, although BAKER does not appear to explicitly disclose a sulfided hydrodesulfurization catalyst having a thiophene desulfurization activity greater than 30% as defined in the instant application under the conditions described therein, it is obvious that, since the catalyst of BAKER and the instant application are the same,

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under the same reaction conditions, the catalyst of BAKER would have the same level of catalyst activity as that required in the instant application.

14. **Claims 4-7 and 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over BAKER, Jr. ET AL (US 5951848) in view of TOBA ET AL in *Journals of Materials Chemistry* (1994, vol 4, no 7, pgs 1131-1135) and CHEN ET AL (US 6723297 B2) as applied to claims 1 and 2 above and further in view of SHIMIZU ET AL in *Catalysis Today* (1998, vol 45, pgs 271-276) and SPEIGHT in *The Desulfurization of Heavy Oils and Residua* (1999, CRC Press, 480 pgs) hereafter referred to as SHIMIZU and SPEIGHT, respectively.**

15. BAKER does not appear to explicitly disclose the hydrodesulfurization catalyst wherein the Ni and W are impregnated on the carrier in the presence of a chelating agent. However, SHIMIZU discloses [see, e.g., the abstract & paragraphs 4, page 272] catalysts prepared with a chelating agent by impregnating γ -Al₂O₃ with an aqueous solution containing nickel nitrate and ammonium metatungstate and a chelating agent comprising one of ethylenediaminetetraacetic acid (EDTA) or trans-1,2-cyclohexanediamine-N,N,N',N'-tetraacetic acid (CyDTA).

16. Additionally, it is obvious to one of ordinary skill in the art to recognize that a silica-alumina carrier or any constituent that possesses an acidic component such as a crystalline zeolite could be used in place of the alumina of SHIMIZU as evidenced by SPEIGHT in *The Desulfurization of Heavy Oils and Residua* [paragraphs 4-5, page 185 & paragraph 2, page 190].

17. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the process of BAKER to use the catalyst preparation method of SHIMIZU in view of SPEIGHT due to its greater hydrodesulfurization and hydrogenation activities as disclosed by SHIMIZU [see, e.g., the abstract]. Furthermore, as previously discussed, BAKER discloses a high activity catalyst, which is comprised of nickel and tungsten on a porous, amorphous metal oxide support such as silica-alumina, of which the catalyst of SHIMIZU as evidenced by SPEIGHT is an obvious variant. Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

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18. With respect to claim 5, BAKER does not appear to explicitly disclose that the alumina content of the hydrodesulfurization catalyst is between 10 and 60 wt%. However, the properties of amorphous alumina/silica supports depend on their preparation procedures as evidenced by TOBA [paragraph 1, page 1131 & Tables 1 and 2, page 1133]. For example, the surface area of the catalyst is dependent on both the preparation method (e.g., sol-gel, coprecipitation, or hydrogel kneading) as well as the ratio of alumina to silica. For alumina concentrations ranging from 0 to 50%, which overlaps the range of the instant application, the surface area of silica/alumina support prepared by the sol-gel method has a minimum surface area of 573 m²/g [Table 2]. In most cases, surface area increases with decreasing alumina content regardless of the preparation method [see Table 2]. Therefore, it is obvious that in order for the catalyst of BAKER to have the surface area disclosed (e.g., 170 m²/g in Table 1), the alumina concentration is likely between 0 and 50% as evidenced by TOBA, which overlaps the range in the instant application.

19. With respect to claims 6 and 7, as previously discussed, BAKER discloses a catalyst that is equivalent to the one disclosed by the applicant. For example, the amounts of metals present on the catalyst of BAKER range from 1 to 10 wt% Group VIII (e.g., nickel) and 10 to 30 wt% Group VI (e.g., tungsten) [column 6, lines 7-13] (compare to 2-10 wt% nickel and 5-30 wt% tungsten in the specification [page 3]); the catalysts are pre-sulfided [column 7, lines 28-39]; the surface areas [Table 2] are all greater than 100 m²/g as disclosed in the specification [page 5]; the pore volumes range from 0.33 to 0.45 ml/g, which overlaps the range in the specification [page 6]; and the pore diameters range from 50-400 angstroms, which also overlaps the range in the specification [page 6]. The applicant is reminded that when the prior art device such as the hydrocracking catalyst of BAKER is the same as a composition described in the specification for carrying out the claimed method, it can be assumed the composition will inherently perform the claimed process of cracking n-heptane between 310° and 360° C, and, more specifically, 320 to 350° C as required in claims 6 and 7 of the instant application under the conditions described therein. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986).

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20. With respect to claim 12, BAKER discloses that the concentration of sulfur in the feed may be greater than 700 ppm [see feeds K & L in Table 2].

21. **Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over BAKER, Jr. ET AL (US 5951848) in view of TOBA ET AL in *Journals of Materials Chemistry*, CHEN ET AL (US 6723297 B2), SHIMIZU ET AL in *Catalysis Today* and SPEIGHT in *The Desulfurization of Heavy Oils and Residua* as applied to claims 4-7 and 12 above and further in view of DE BONT ET AL in *Hyperfine Interactions* (1998, vol 11, pgs 39-44), hereafter referred to as DE BONT.**

22. With respect to claim 13, the discussions of BAKER and modified BAKER in the preceding paragraphs are incorporated herein by reference. In addition, it is obvious to one of ordinary skill in the art to subject a feed to a hydrodesulfurization (HDS) process prior to hydrocracking the feed by contacting the feedstock in the presence of hydrogen with a sulfided dehydrodesulfurization catalyst as evidenced by DE BONT [see, e.g., paragraph 1, page 39], which discloses a first stage HDS step and a second stage hydrocracking step using a catalyst that combines hydrogenation (Group VI and VIII metal sites) and cracking (acidic, alumina/silica sites).

23. With respect to claims 14 and 15, CHEN '297 discloses [see, e.g., column 7, lines 8-57 & column 8, lines 13-17] a molecular sieve (zeolite) ranging from 0 to 60 wt%, which subsumes the range in claim 14 of the instant application, wherein the zeolite includes zeolite-Y, zeolite- β , and zeolite ZSM, as required in claim 15 of the instant application.

24. **Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over BAKER, Jr. ET AL (US 5951848) in view of TOBA ET AL in *Journals of Materials Chemistry*, CHEN ET AL (US 6723297 B2), SHIMIZU ET AL in *Catalysis Toda*, SPEIGHT in *The Desulfurization of Heavy Oils and Residua*, and DE BONT ET AL in *Hyperfine Interactions* as applied to claims 13-15 above and further in view of SEQUEIRA in *Lubricant Base Oil and Wax Processing* (1994, Marcel Dekker, 288 pgs).**

25. With respect to claims 16 and 17, BAKER discloses [see, e.g., column 3, lines 43-50] a pour point reducing step comprised of catalytic dewaxing although solvent dewaxing is an equivalent process that is well known to one of

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ordinary skill in the art as evidenced by SEQUEIRA [paragraph 5, page 4] in which is disclosed that catalytic dewaxing is an alternative to solvent dewaxing.

26. BAKER discloses [column 9, lines 13-24 & 45-62] a platinum/ZSM-22 or platinum/ZSM-23 catalyst bound to silica as referenced by BAKER to PLANK ET AL (US 4076842) [column 9, line 26].

27. **Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over BAKER, Jr. ET AL (US 5951848) in view of TOBA ET AL in *Journals of Materials Chemistry*, CHEN ET AL (US 6723297 B2), SHIMIZU ET AL in *Catalysis Toda*, SPEIGHT in *The Desulfurization of Heavy Oils and Residua*, and DE BONT ET AL in *Hyperfine Interactions*, and SEQUEIRA in *Lubricant Base Oil and Wax Processing* as applied to claims 16-18 above and further in view of CHEN ET AL (US 4919788), hereafter referred to as CHEN '788.**

28. With respect to claim 19, it is well known to one of ordinary skill in the art that a platinum/ZSM-12 can be used in a catalytic dewaxing process in place of a platinum/ZSM-22 or platinum/ZSM-23 catalyst as evidenced by CHEN '788 [column 20, lines 16-61].

Response to Arguments

29. Applicant's arguments with respect to claims 1-2, 4-8, and 12-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

30. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

31. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN MCCAIG whose telephone number is (571) 270-5548. The examiner can normally be reached on M-F 8-430.

33. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

34. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BAM
3/26/2009

/Glenn A Caldarola/
Acting SPE of Art Unit 1797